

Patent claims

1. A circuit arrangement comprising a low-temperature circuit (NK) for cooling charge air (13) that is fed to an engine (8) in a motor vehicle equipped with a turbocharger, characterized in that the charge air (13) is compressed in two stages in a first low-pressure turbocharger (1) and a second high-pressure turbocharger (2), where, in order to cool the charge air (13), a first cooler (3) is provided downstream of the low-pressure turbocharger (1) and upstream of the high-pressure turbocharger (2), and a second cooler (4) is provided downstream of the high-pressure turbocharger (2) and upstream of the engine (8).
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2. The circuit arrangement as claimed in claim 1, characterized in that a low-pressure charge air/coolant cooler (3) is provided for the first cooling of the charge air (13).
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3. The circuit arrangement as claimed in claim 1 or 2, characterized in that a high-pressure charge air/air cooler (4) is provided for the second cooling of the charge air (13).
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4. The circuit arrangement as claimed in claim 3, characterized in that the high-pressure charge air/air cooler (4) is arranged alongside a low-temperature cooler (5) and, seen in the direction of air flow of the cooling air (15), upstream of a main coolant cooler (6).
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- 35 5. The circuit arrangement as claimed in claim 4, characterized in that the front face of the low-temperature cooler (5) takes up 20% to 50% of the total front surface.

6. The circuit arrangement as claimed in one of claims 1 through 5, characterized in that the low-temperature circuit (NK) is independent of the engine cooling circuit (MK) and has its own pump (10) for delivering the coolant (14).
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7. The circuit arrangement as claimed in claim 6, characterized in that the pump (10) in the low-temperature circuit (NK) is arranged between the low-temperature cooler (5) and the low-pressure charge air/coolant cooler (3) or between the low-pressure charge air/coolant cooler (3) and the low-temperature cooler (5).
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8. The circuit arrangement as claimed in one of claims 1 through 5, characterized in that the low-temperature circuit (NK) is part of an engine cooling circuit (MK).
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9. The circuit arrangement as claimed in claim 8, characterized in that the low-temperature circuit (NK) branches off from the pressure side of a pump (9) from the engine cooling circuit (MK) and is fed back to the engine cooling circuit (MK) at the engine outlet.
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10. A method for operating a circuit arrangement (K) as claimed in one of the preceding claims, characterized in that the charge air (13) is cooled in at least two stages, in each case after a compression.
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11. The method for operating a circuit arrangement (K) as claimed in claim 10, characterized in that the charge air (13) after the intermediate cooling in the low-pressure turbocharger (1) has a temperature of between 40°C and 110°C.
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